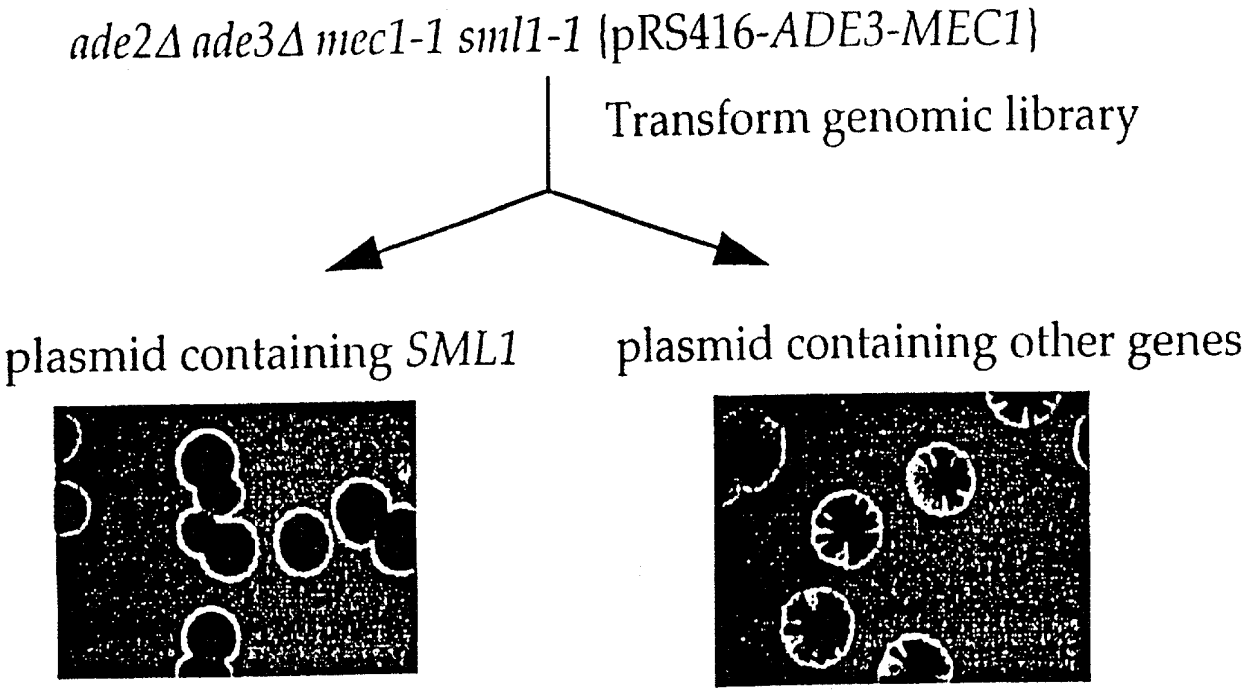
FIG. 1A


ade2Δ ade3Δ mec1-1 sml1-1 {pRS416-*ADE3-MEC1*}
Transform genomic library
plasmid containing *SML1*
plasmid containing other genes

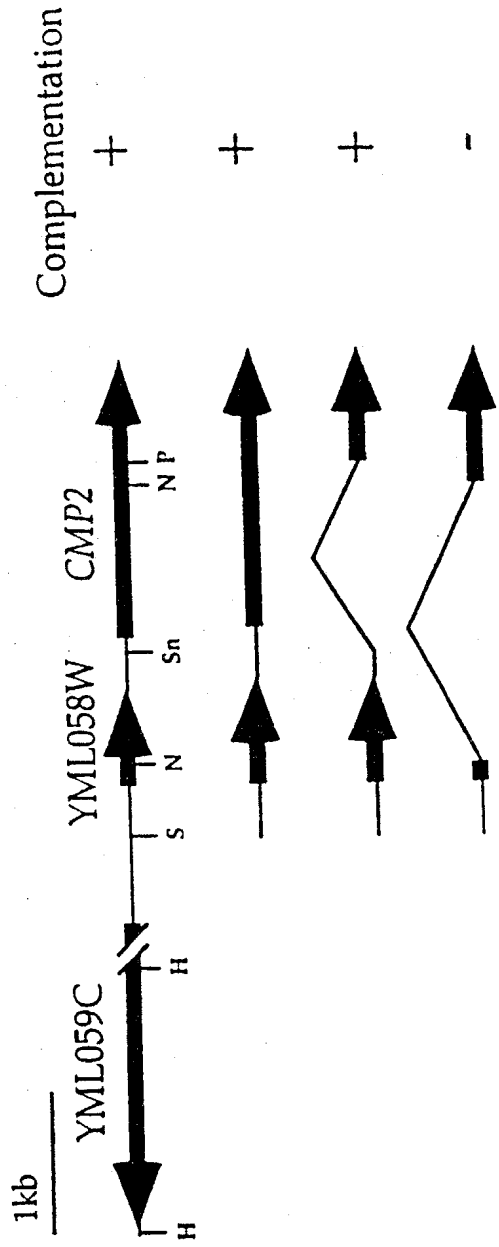


FIG. 1B

FIG. 1C

```
AATGAGCAACCGTGTCAACAAGAGTGTCAAGACCGGCTACTTATTCCCCAAGGATCACGTTCCTTCTGCCAACATCATTG
CCGTCGAACGTCGCGGCGGTCTTTCTGACATTGGTAAGAATACTTCCAACTAAGAGCATGCTTCTCTTTTTTTTTTT
GTAGGCCAATGATAGGAAAGAACAATAGATTATAAATACGTCAGAATATAGTAGATATGTTTTTATGTTTAGACCTCGTA
CATAGGAATAATTGACGTTTTTTTTTTGGCCAACATTTGAAATTTTTTTTTGTTACCTCGCGCTGAGCCCAAACGGGCTCC
ACTACCCGCCGCGGTCGCCATTTTGGGAAGTCATCCGTCCCAAAAAGGAAATAGCCATAACATATCGTTACTGTTTTGGA
ACATCGCCCGTTTCGCCCGATTCCGCCTCAGCGGGTATAAAAAGAGATCTTTTTTTTTTTCCTGGCTGTCCCTTC
CATTTTTAAATGTCTTATCTGCTCCTTTGTGATCTTACGGTCTCACTAACCTCTCTTCAACTGCTCAATAATTTCCCGCT

   ATG CAA AAT TCC CAA GAC TAC TTT TAC GCT CAA AAT CGC TGC CAA CAA CAA CAA GCC CCT
 1 M   Q   N   S   Q   D   Y   F   Y   A   Q   N   R   C   Q   Q   Q   Q   A   P
   TCC ACA TTG CGT ACC GTG ACC ATG GCG GAA TTT AGA AGG GTG CCT TTG CCA CCT ATG GCT
21 S   T   L   R   T   V   T   M   A   E   F   R   R   V   P   L   P   P   M   A
   GAG GTT CCT ATG TTG TCT ACT CAA AAC TCC ATG GGC AGC TCC GCT TCT GCC TCC GCT TCT
41 E   V   P   M   L   S   T   Q   N   S   M   G   S   S   A   S   A   S   A   S
   TCA TTA GAA ATG TGG GAA AAG GAT TTG GAG GAG AGA CTC AAC TCT ATC GAT CAT GAC ATG
61 S   L   E   M   W   E   K   D   L   E   E   R   L   N   S   I   D   H   D   M
   AAC AAC AAC AAA TTT GGT TCT GGC GAA CTA AAA TCT ATG TTC AAC CAG GGT AAG GTC GAG
81 N   N   N   K   F   G   S   G   E   L   K   S   M   F   N   Q   G   K   V   E
   GAA ATG GAC TTC TAA  AGTTCCTTTCATACTCTTTTCTTTTCTCTTTCCATTTCCCACTAGTTCTGTTCTTTTC
01 E   M   D   F   *
   TTCTCTTAGATACCCTTCTTTTCAGGGACTCTCGTCCTACTATTGTTGTCATTCTCGAAACATTCTCTCCCGTGCATTT
   TCCTTTCCCTTTATATACATATATATATATATATATATATATGTCTCTTCTACGTATTTTTGTATTTCTGTGTCTTTAT
   CAAAGATAGTCTATAATACGTTTGATACAGCTAGATATCGCTAGCGCCAACATTGTCCCCCTCTCTTGATCAATGCTTT
```

FIG. 2A

mec1Δ/+ sml1Δ/+

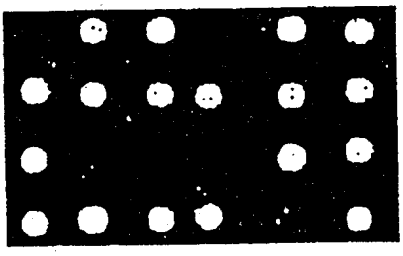


FIG. 2B

mec1Δ/+ sml1Δ/+ dun1Δ/+

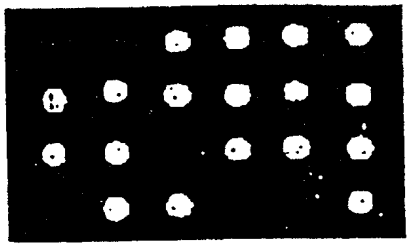


FIG. 2C

mec1Δ/+ sml1Δ/+ tel1Δ/+

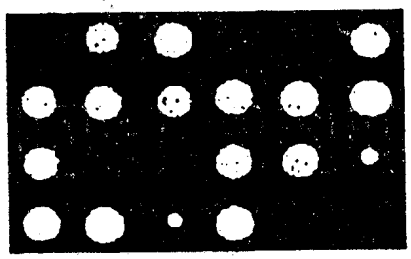


FIG. 2D

rad53Δ/+ sml1Δ/+

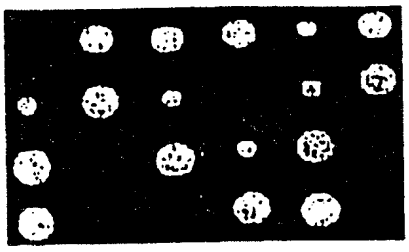


FIG. 3A

sml1Δ

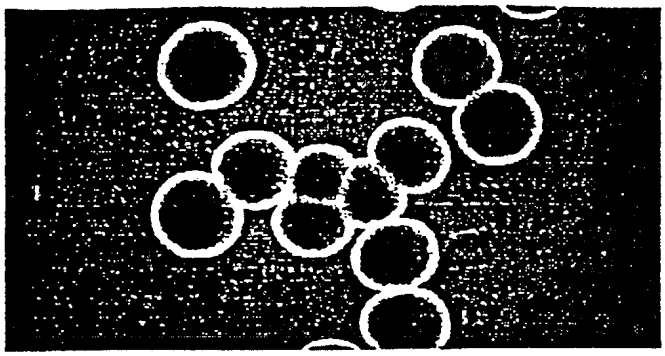


FIG. 3B

SML1

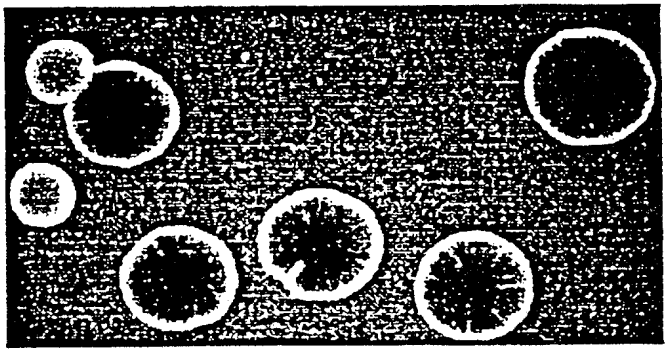


FIG. 3C

2XSML1

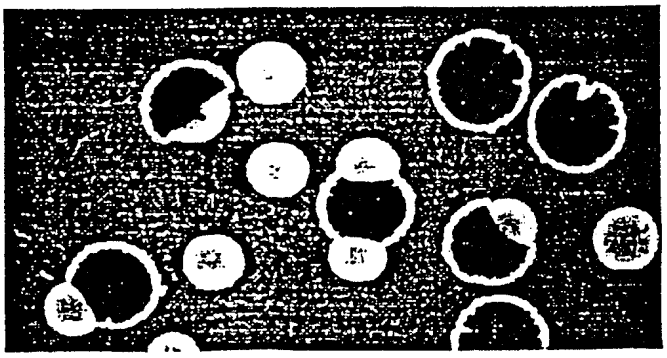


FIG. 3D

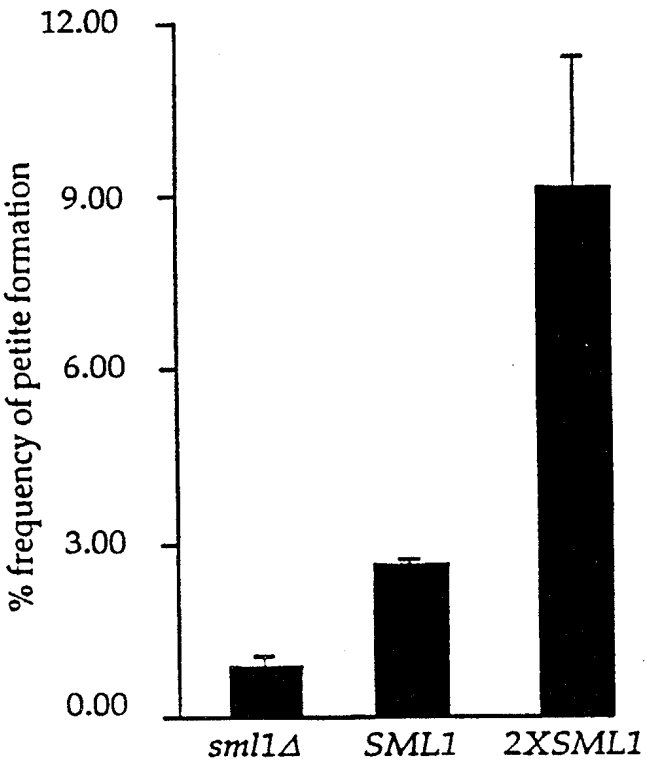
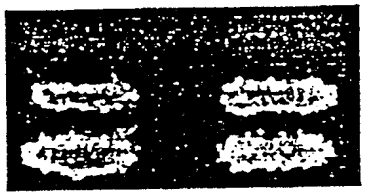

12.00
9.00
6.00
3.00
0.00
% frequency of petite formation
sml1Δ
SML1
2XSML1

FIG. 3E

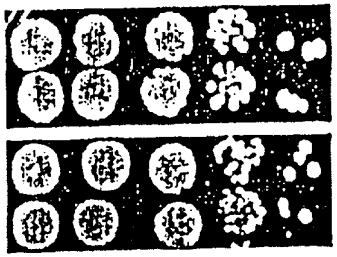
mip1-1
sml1Δ mip1-1
MIP1



YPGlycerol
at 37°C

FIG. 4A

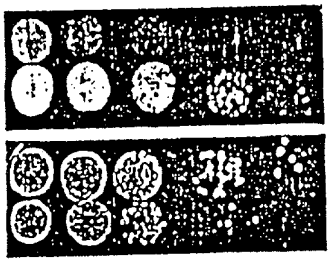
YPD



YPD

FIG. 4B

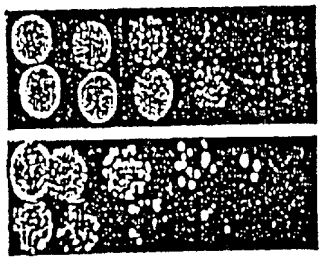
400 mM HU



100 mM HU

FIG. 4C

0.05% MMS



0.05% MMS

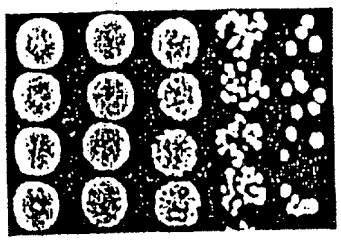
WT

sml1Δ

WT

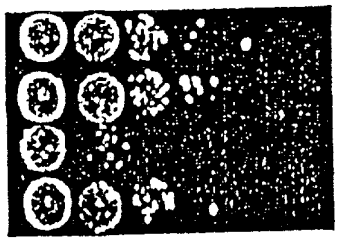
2XSML1

FIG. 4D



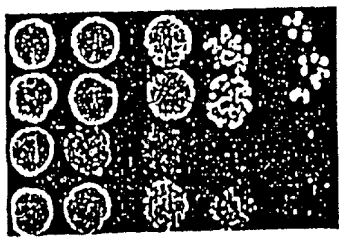
YPD

FIG. 4E



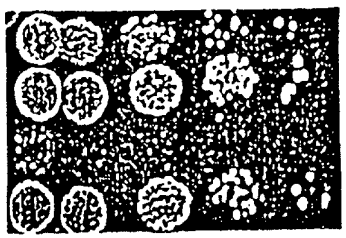
120 J/m^2

FIG. 4F



50 mM HU

FIG. 4G



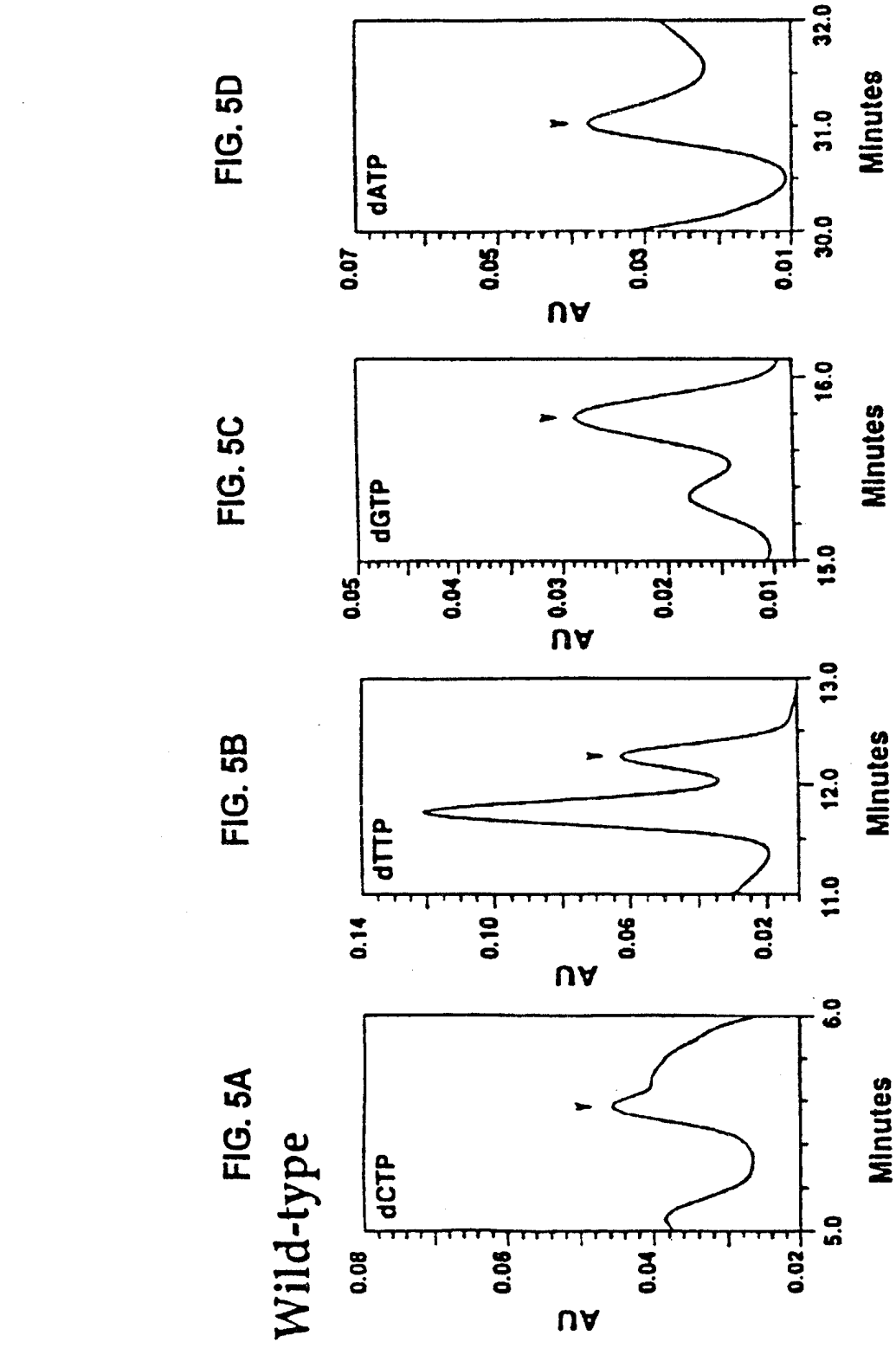
0.05% MMS

WT

sml1Δ

dun1Δ

dun1Δ sml1Δ


Wild-type
FIG. 5A
dCTP
AU
0.08
0.06
0.04
0.02
5.0
6.0
Minutes
FIG. 5B
dTTP
AU
0.14
0.10
0.06
0.02
11.0
12.0
13.0
Minutes
FIG. 5C
dGTP
AU
0.05
0.04
0.03
0.02
0.01
15.0
16.0
Minutes
FIG. 5D
dATP
AU
0.07
0.05
0.03
0.01
30.0
31.0
32.0
Minutes

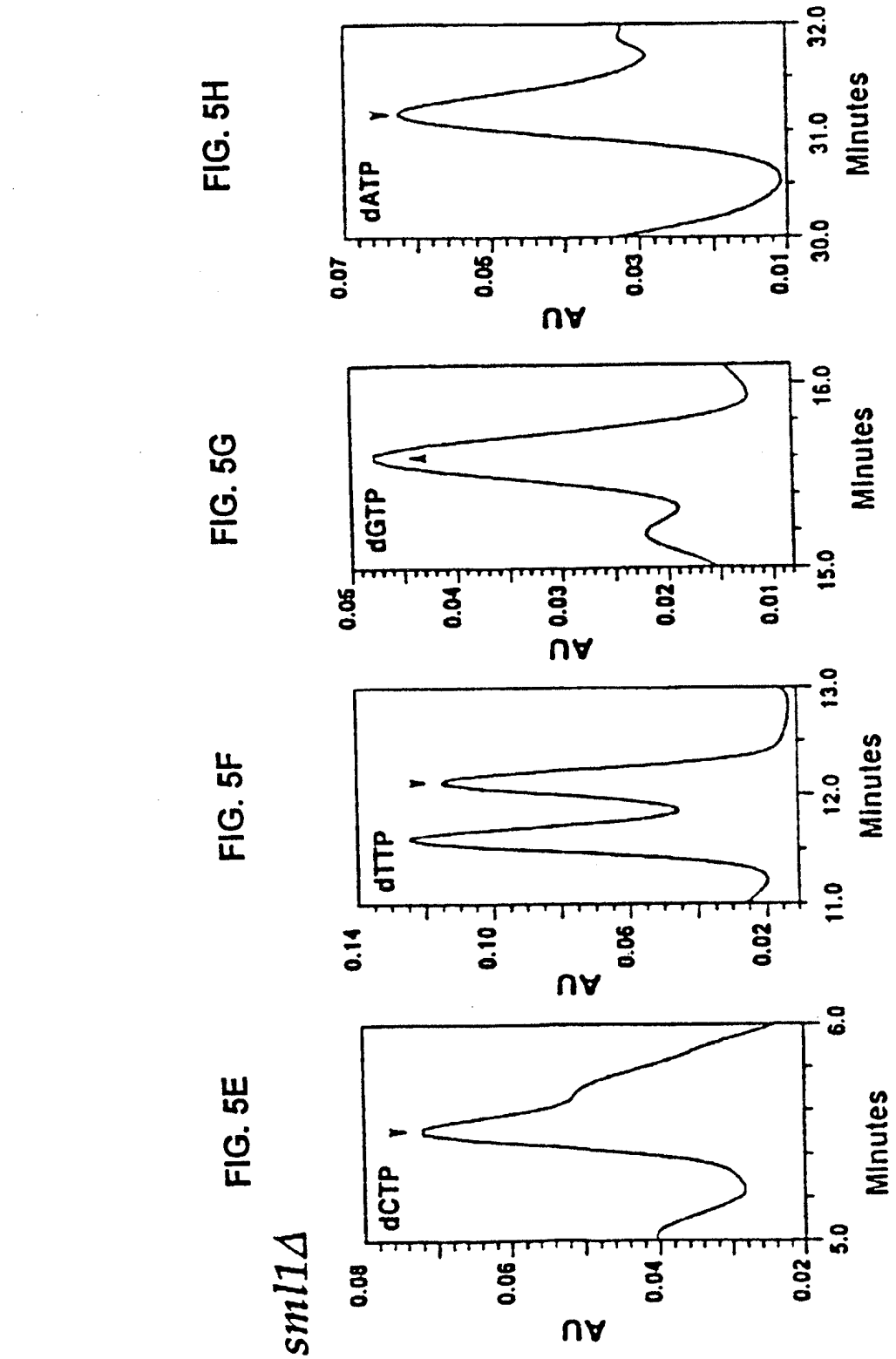

sml1Δ
FIG. 5E
FIG. 5F
FIG. 5G
FIG. 5H
dCTP
dTTP
dGTP
dATP
AU
Minutes
0.08
0.06
0.04
0.02
5.0
6.0
0.14
0.10
0.06
0.02
11.0
12.0
13.0
0.05
0.04
0.03
0.02
0.01
15.0
16.0
0.07
0.05
0.03
0.01
30.0
31.0
32.0

FIG. 5I

	dCTP	dTTP	dGTP	dATP
wild-type	386	869	171	327
sml1Δ	1071	2118	414	855
fold increase	2.6	2.4	2.4	2.6

Deoxyribonucleotide levels are shown as pmol/10^9 cells

FIG. 5J

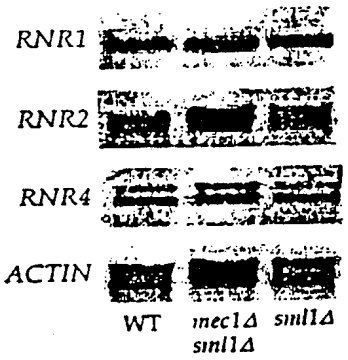

RNR1
RNR2
RNR4
ACTIN
WT
mec1Δ sml1Δ
sml1Δ

FIG. 5K

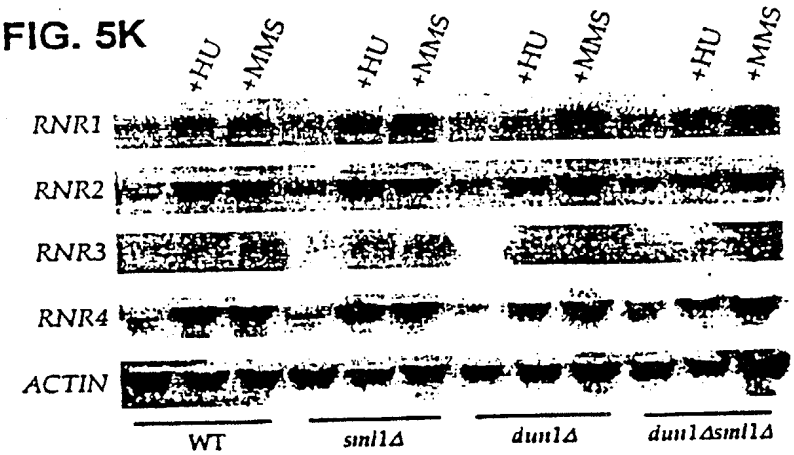

+HU
+MMS
+HU
+MMS
+HU
+MMS
+HU
+MMS
RNR1
RNR2
RNR3
RNR4
ACTIN
WT
sml1Δ
dun1Δ
dun1Δsml1Δ

FIG. 6

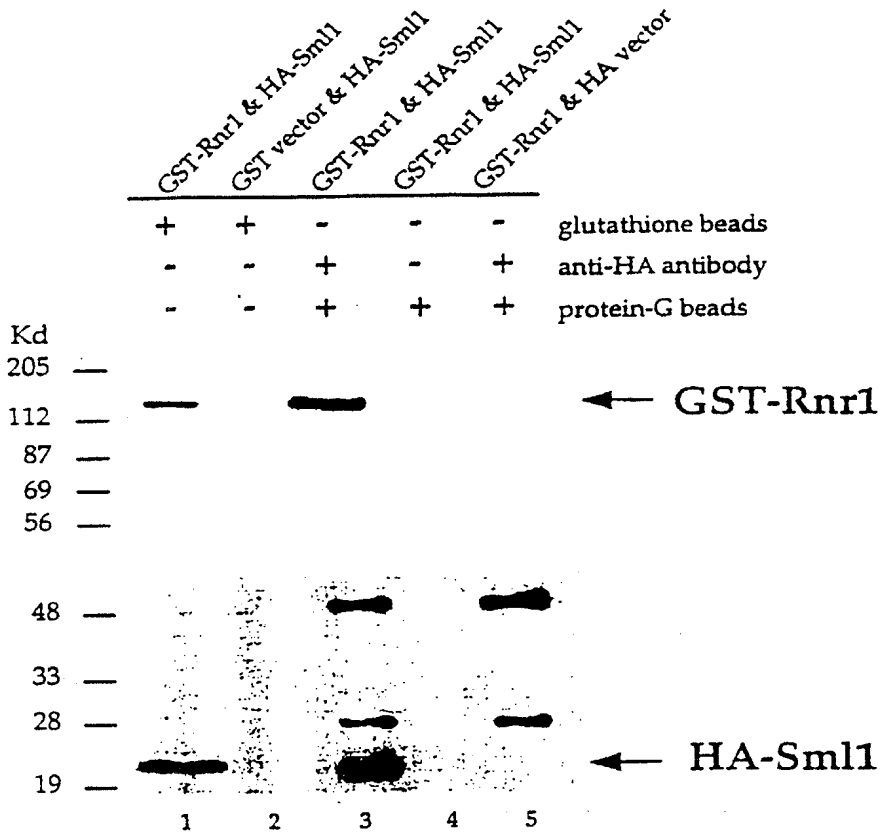
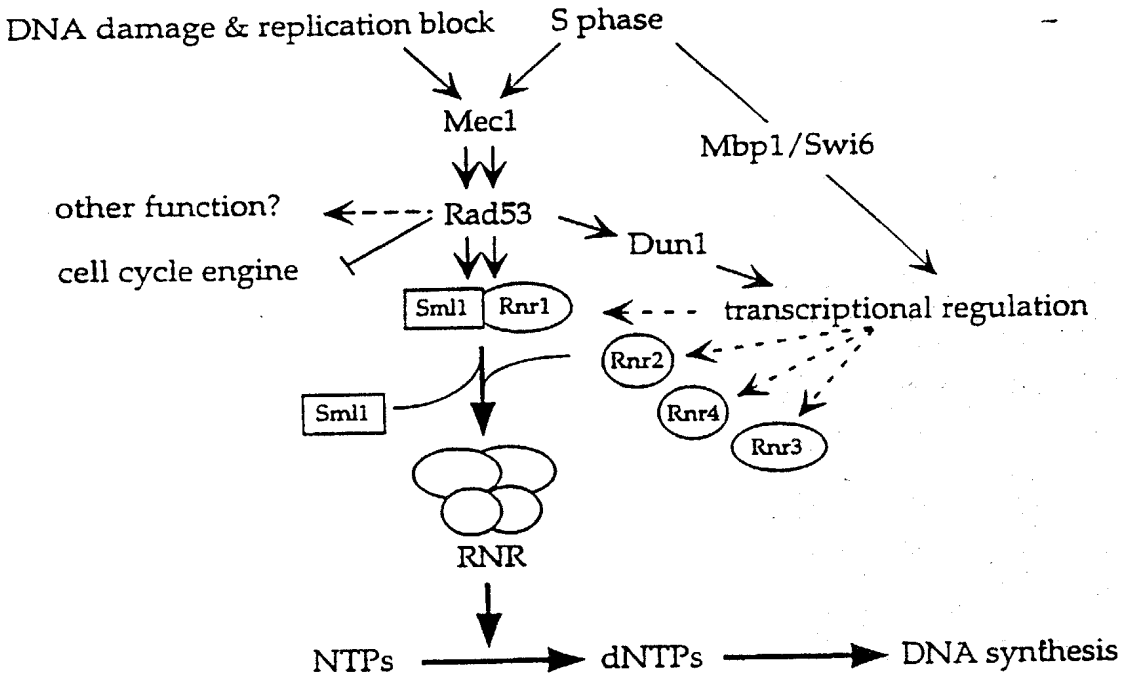

GST-Rnr1 & HA-Sml1
GST vector & HA-Sml1
GST-Rnr1 & HA-Sml1
GST-Rnr1 & HA-Sml1
GST-Rnr1 & HA vector
+ + - - - glutathione beads
- - + - + anti-HA antibody
- - + + + protein-G beads
Kd
205
112
87
69
56
48
33
28
19
GST-Rnr1
HA-Sml1
1 2 3 4 5

FIG. 7


DNA damage & replication block
S phase
Mec1
Mbp1/Swi6
other function?
Rad53
Dun1
cell cycle engine
Sml1
Rnr1
transcriptional regulation
Rnr2
Rnr4
Rnr3
Sml1
RNR
NTPs
dNTPs
DNA synthesis

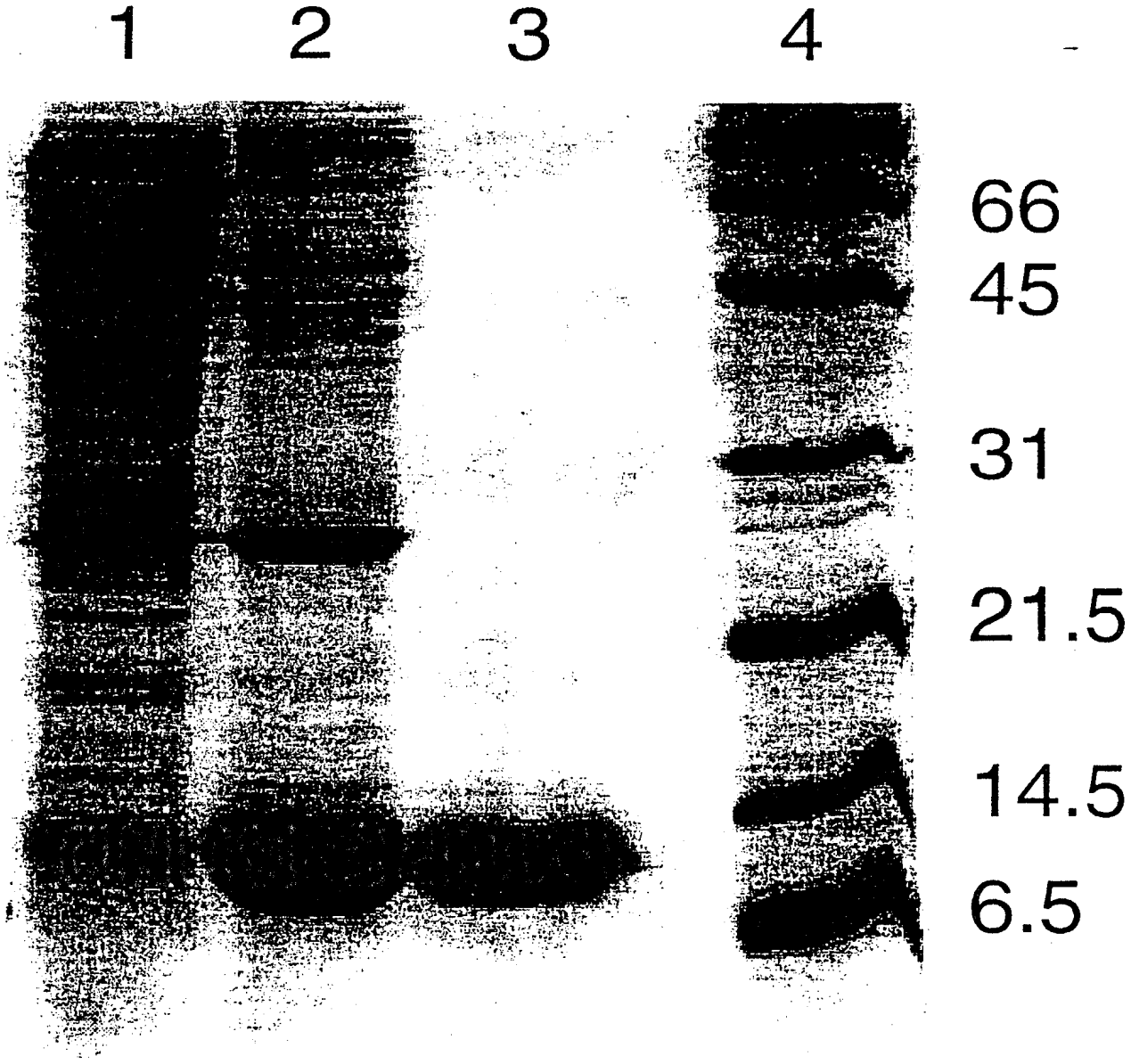


FIGURE 8

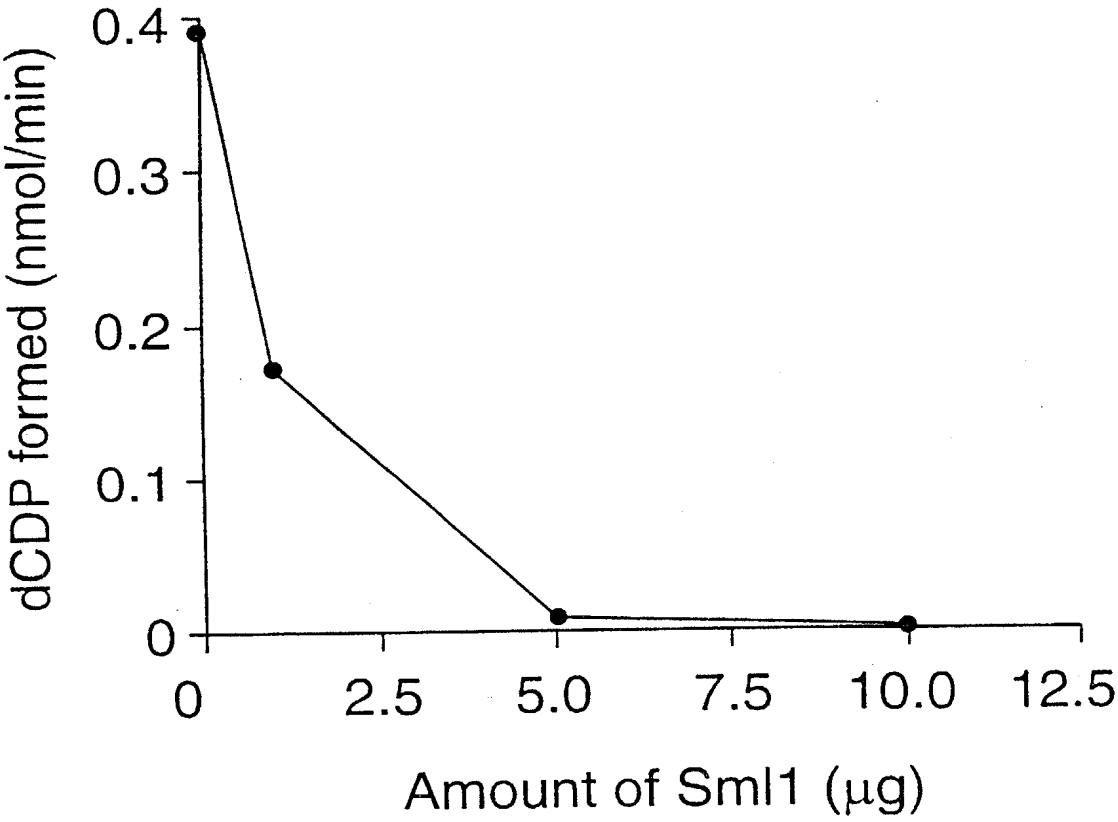

0.4
0.3
0.2
0.1
0
dCDP formed (nmol/min)
0
2.5
5.0
7.5
10.0
12.5
Amount of Sml1 (μg)

FIGURE 9

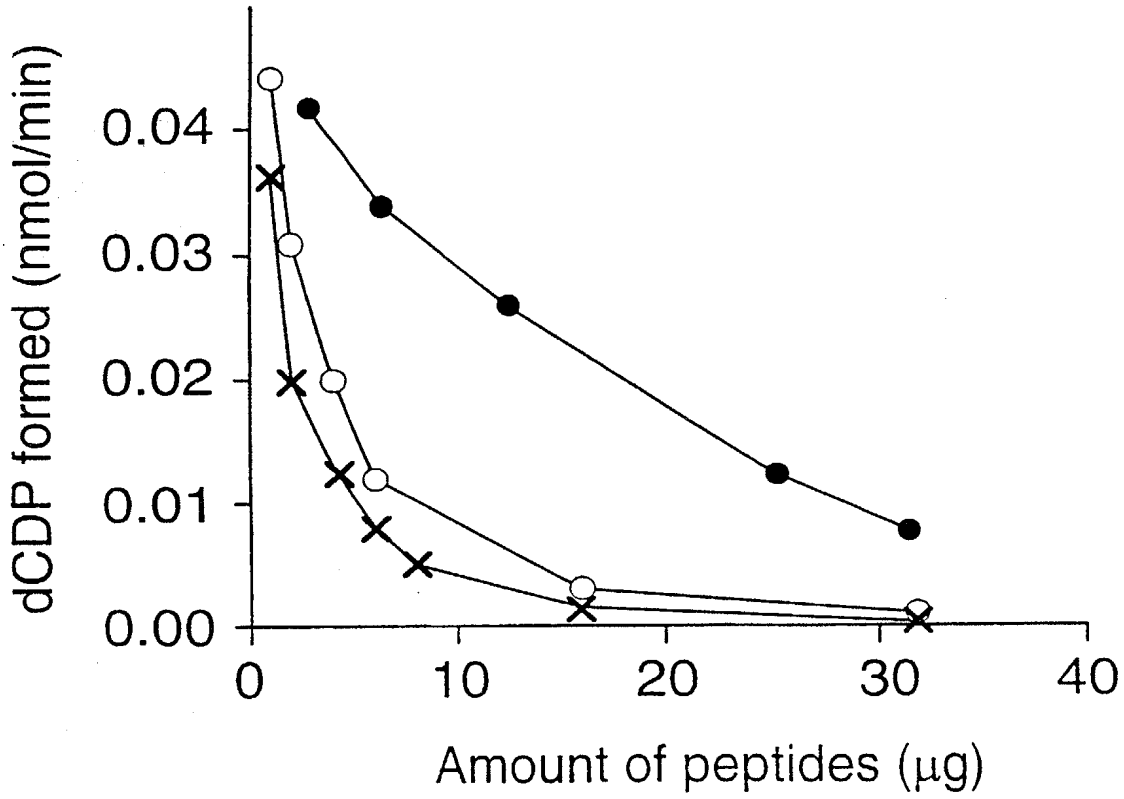

dCDP formed (nmol/min)
0.04
0.03
0.02
0.01
0.00
0
10
20
30
40
Amount of peptides (µg)

FIGURE 10

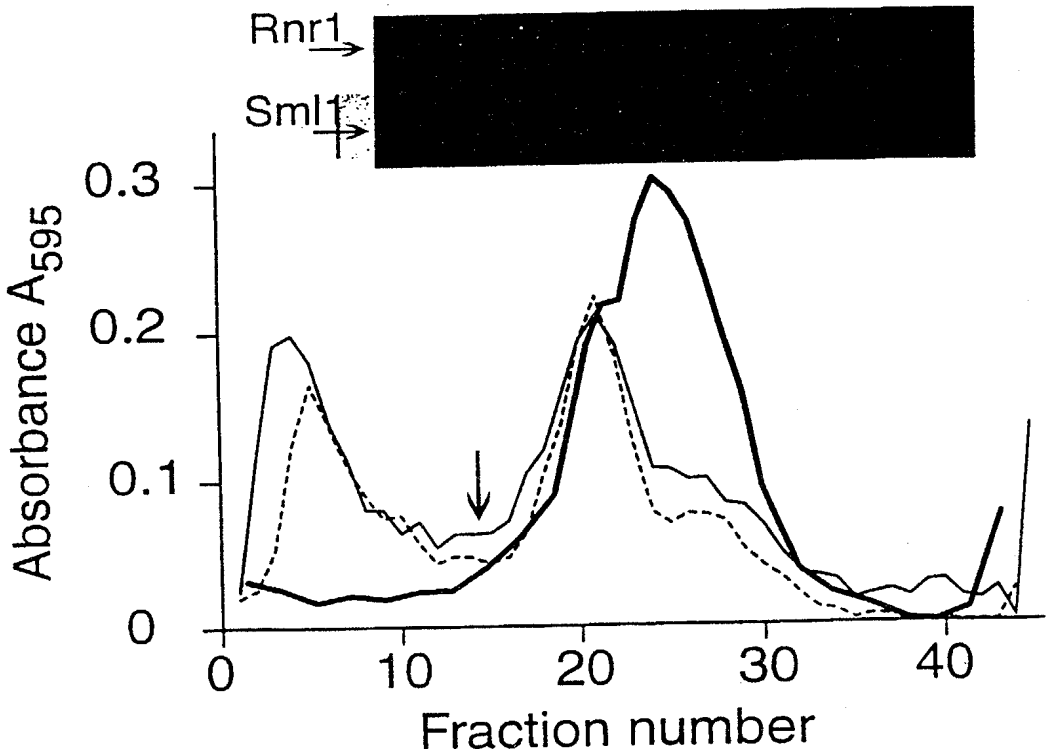

Rnr1
Sml1
Absorbance A_{595}
0.3
0.2
0.1
0
0
10
20
30
40
Fraction number

FIGURE 11

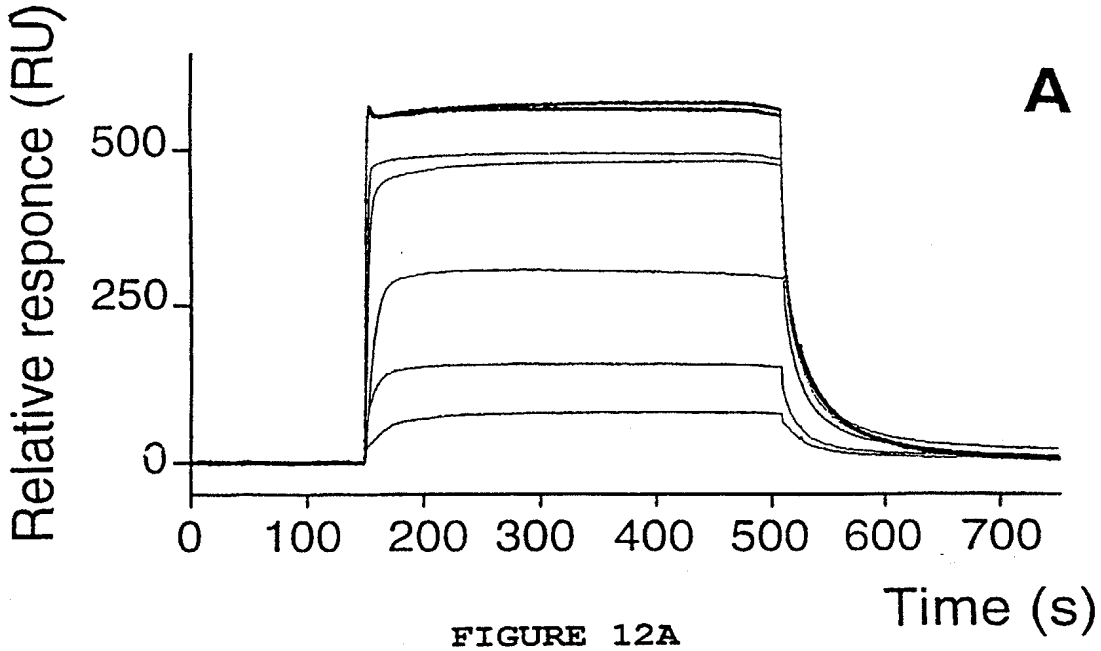


FIGURE 12A

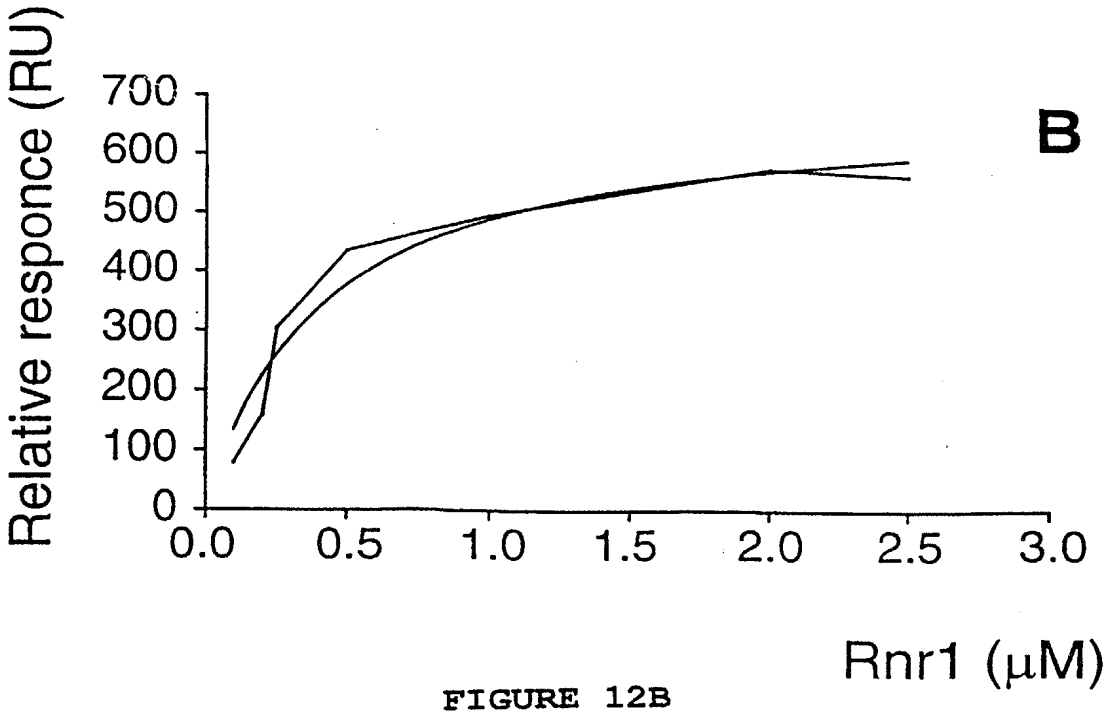


FIGURE 12B

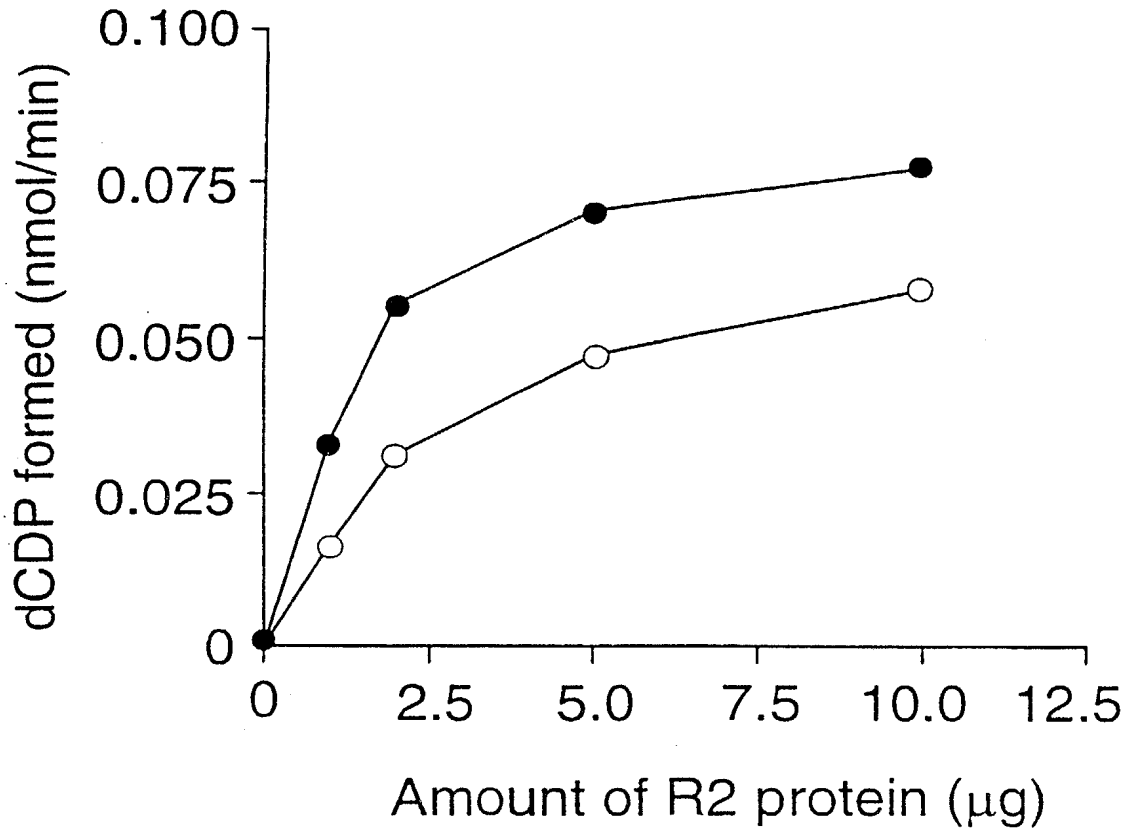

0.100
0.075
0.050
0.025
0
dCDP formed (nmol/min)
0
2.5
5.0
7.5
10.0
12.5
Amount of R2 protein (μg)

FIGURE 13

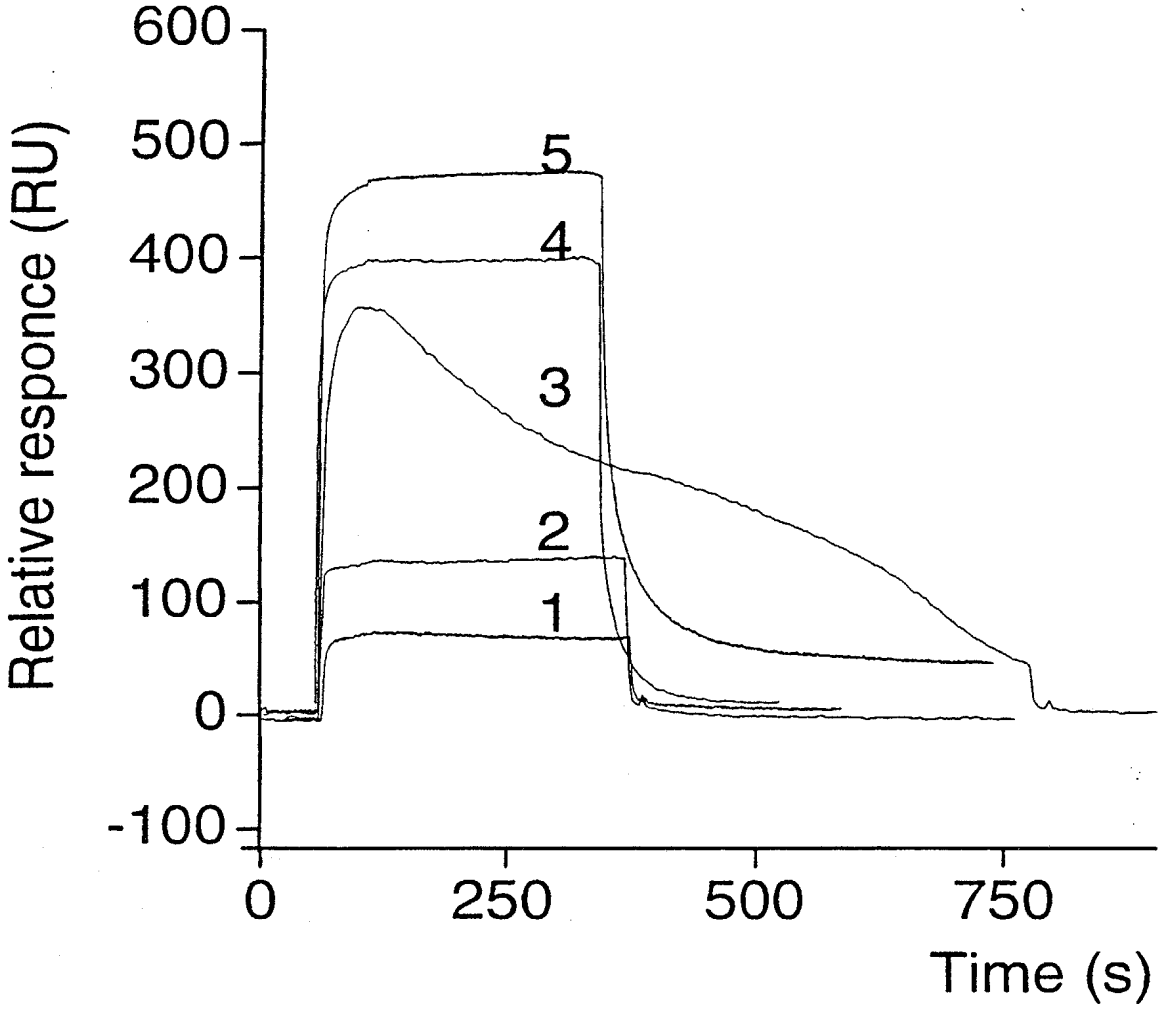

600
500
400
300
200
100
0
-100
Relative responce (RU)
5
4
3
2
1
0
250
500
750
Time (s)

FIGURE 14